abstract) with the substitute specification (pages 1-8) appended hereto at Tab 1*.

In the Claims

Please cancel claims 1-5 without prejudice. Please add new claims 6-17 appended hereto at Tab 3.

In the Abstract

Please delete the Abstract and replace the Abstract with the replacement Abstract appended hereto at Tab 4**.

REMARKS

A. Introduction

Applicant has amended the application to conform the specification and claims to United States patent prosecution practice and to select claimed embodiments for prosecution at this time. Also, applicant has made a typographical and a grammatical amendment of the Abstract.

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* A "Marked-up Version of Substitute Specification Pursuant to 37 C.F.R § 1.12(b)(3)(iii)" is appended hereto at Tab 2.

** A "Marked-up Version of Replacement Abstract Pursuant to 37 C.F.R. § 1.121(b)(2)(iii)" is appended hereto at Tab 5.

B. Amendments of the Specification

Applicant has amended the specification by submitting a substitute specification under 37 C.F.R. § 1.121(b)(3). The substitute specification includes no new matter. (A "Marked-up Version of Substitute Specification Pursuant to 37 C.F.R. § 1.121(b)(3)(iii)" is appended hereto at Tab 2.) Amendments of the specification are discussed below.

1. Addition of Section Headings, Amendment of Brief Description of Drawings

Applicant has added the heading "Background of the Invention" at page 1 of the specification, immediately before the first paragraph, pursuant to 37 C.F.R. § 1.77(b)(5).

Applicant has added the heading "Summary of the Invention" at page 4 of the specification, immediately before the first full paragraph, pursuant to 37 C.F.R. § 1.77(b)(6).

The specification included a brief description of FIGS. 1 and 2 at page 6, line 24 to page 7, line 2. Applicant has (1) amended the aforementioned brief description to better describe the FIGS.; (2) relocated the brief description to page 4, immediately before the last paragraph beginning on the page; and (3) added the

heading "Brief Description of the Drawings" immediately before the aforementioned description, pursuant to 37 C.F.R. § 1.77(b)(7).

Applicant has added the heading "Detailed Description of the Invention" at page 4 of the specification, immediately before the second full paragraph pursuant to 37 C.F.R. § 1.77(b)(8).

2. Replacement of Reference to Claims

At page 6, line 22, the specification made reference to "claims which are subordinate to claim 1". Applicant has replaced that reference with language from claims 2-5 to conform the specification to U.S. patent prosecution practice (see paragraph 15, lines 3-26 of the substitute specification). MPEP § 608.01(l) ("In establishing a disclosure, applicant may rely not only on the description and drawings as filed but also on the original claims if their content justifies it."). Also, applicant has amended the sentence that included the reference as necessary to introduce the replacement language.

3. Amendment of Description of FIGS.

Applicant has amended the specification at page 7, second paragraph, first sentence, to more clearly describe FIG. 1. Applicant has made a similar amendment,

regarding FIG. 2, at page 7, third paragraph, first sentence.

4. Clerical, Typographical, and Grammatical Amendments

Applicant has deleted an attorney docket number and a date at page 1, lines 1-2.

Applicant has added paragraph numbering and line numbering to the specification to facilitate the identification of text therein.

Applicant has amended the specification to correct minor typographical and grammatical errors at the following locations:

Originally Filed Specification	Marked-Up Version of the Specification (at Tab 2)
Page 1, line 3	Title
Page 1, line 5	Para. 1, line 2
Page 1, lines 11-13, 15, 17, and 19	Para. 2, lines 1-3, 5, 7, and 9
Page 1, line 26	Para. 3, line 6
Page 2, lines 10 and 11	Para. 3, lines 19 and 20
Page 2, lines 14, 15, 17-19, 23, 25-28, and 30-32	Para. 4, lines 1,2, 4-6, 10, 12-16, 18, and 19
Page 3, lines 1 and 4	Para. 5, lines 1 and 4

Originally Filed Specification	Marked-Up Version of the Specification (at Tab 2)
Page 3, lines 11, 16, and 30	Para. 6, lines 2, 6, and 21
Page 4, lines 6, and 8-9	Para. 7, lines 2 and 5
Page 4, lines 12, 19, 20, 22, 26, and 30	Para. 10, lines 2, 10, 12, 17, and 21
Page 5, lines 5, 9, 11, and 13	Para. 11, lines 6, 9, 12, and 13
Page 6, line 2	Para. 13, line 8
Page 6, lines 11 and 14	Para. 14, lines 7 and 10
Page 6, line 21	Para. 15, line 3
Page 7, lines 3-7	Para 16, lines 1, 3-5, and 7
Page 7, lines 9, 16, and 19	Para. 17, lines 1, 8, and 12

The foregoing grammatical amendments include the replacement of the word "comprising" by the word "including" in three locations. (See the "Marked-up Version of Substitute Specification Pursuant to 37 C.F.R. § 1.121(b)(3)(iii)", appended hereto at Tab 2, at para. 2, line 2; para. 3, line 20; and para. 19, line 2.)

C. Amendments of the Claims

Applicant has canceled claims 1-5 without prejudice and has added new claims 6-17 having subject matter that was present in the canceled claims.

Applicant respectfully reserves the right to pursue the subject matter of canceled claims 1-5, including any embodiments originally defined by improper multiple dependent claims, in one or more continuation or divisional applications.

Claims 1-5 were replaced by claims 6-17 to remove improper multiple dependencies, to select claimed embodiments for prosecution at this time, and to conform the claims to U.S. patent prosecution practice. Support for new claims 6-17 is found throughout the specification as originally filed, particularly at pages 4-7. Support for new claims 6-17 is also found in originally filed claims 1-5, as summarized in the following table.

New Claim	Supporting claim(s)
6	1
7	1, 2
8	1-3
9	1-4
10	1, 2, 4
11	1, 3
12	1, 3, 4
13	1, 4
14	1, 5

New Claim	Supporting claim(s)
15	1, 2, 5
16	1, 3, 5
17	1, 4, 5

The new claims include no new matter.

D. Amendments of the Abstract

Applicant has amended the Abstract by submitting a replacement Abstract under 37 C.F.R. § 1.121(b)(2). The replacement Abstract includes no new matter. (A "Marked-up Version of Replacement Abstract Pursuant to 37 C.F.R § 1.121(b)(2)(iii)" is appended hereto at Tab 5.)

Applicant has made a typographical amendment of the abstract at line 2. Applicant has also made a grammatical amendment at line 7.

E. Conclusion

Applicant has amended the application to conform the specification and claims to U.S. patent prosecution practice and to select claimed embodiments for prosecution at this time. Also, applicant has made a typographical and grammatical amendment of the Abstract. Applicant respectfully requests entry of this Preliminary

Amendment. A favorable action is respectfully requested.

Respectfully submitted,

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July 26, 2002

Lillian Garcia

Lillian Garcia

Signature of Person Signing

MARKED UP VERSION OF SUBSTITUTE SPECIFICATION
PURSUANT TO 37 C.F.R.§ 1.121(b)(3)(iii)

[GS/jo 991238]
[November 29, 2001] VAW-6

A METHOD FOR PRODUCING AN ALUMIN[I]UM COMPOSITE MATERIAL

BACKGROUND OF THE INVENTION

[0001] The invention relates to a method for producing an alumin[i]um composite material in which a cladding sheet is placed onto at least one side of a core ingot, and in which the core ingot with cladding sheets in place, is subjected to several roll passes. Furthermore, the invention relates to a method for producing cladding sheets from an ingot.

[0002] The production of alumin[i]um composite materials [comprising] including at least two different alumin[i]um materials (i.e., two different alumin[i]um alloys) is particularly advantageous for various applications or it makes it possible to use alumin[i]um materials for particular applications. In this context, cladding by rolling represents a method for producing alumin[i]um composite materials which makes it possible in a simple way to produce large quantities of alumin[i]um composite strip or foil.

[0003] The actual cladding by rolling takes place in several steps, wherein the deformability during rolling depends on the particular material. If the limit of deformability is reached, the rolling process has to be interrupted and renewed heating, to the rolling temperature (above the recrystalli[s]zation threshold), has to be carried out. The ingot thickness as a starting format for hot rolling is selected such that even when thick sheets are rolled, the best possible kneading of the cast structure is achieved. The higher the material is alloyed and the lower the temperature during the last pass of the rolling material being rolled, the higher the hardening remaining in the material. In the case of plates or sheets intended for cladding by rolling, this may under certain circumstances lead to difficulties if these products do not achieve the specified strength values in the hot-rolling state on the available roll stands. Cladding by rolling takes place approximately at temperatures of 250[ ]°C to 400[ ]°C without intermediate annealing, with a lubricant [comprising] including rolling oil, rolling emulsion or a mixture of rolling oil and rolling emulsion.

[0004] By producing alumin[i]um composite materials, the properties of different alumin[i]um materials can be combined in an optimal way. Thus for example, cladding of high-strength alumin[i]um alloys with particularly corrosion-resistant alumin[i]um alloys results in an alumin[i]um composite material in which the core material provides the required strength values while at the same time the cladding material provides a surface with very good corrosion resistance which the core material could not provide because it is optimi[s]zed with regard to the required strength. Furthermore, cladding makes it

possible to produce an alumin[i]um composite material with a melting point of its core material of, for example, 650[ ]°C, while the melting point of the cladding material is, for example, 620[ ]°C. Components from such alumin[i]um composite materials can now be interconnected in that the components are heated in a specific way to [approx.]approximately 630[ ]°C. As a result, the cladding layer melts on and ensures a[n] coherent connection with the adjoining component.

[0005] From the state of the art it is known to produce cladding sheets or plates (for the sake of simplicity, hereinafter mostly called "sheets") for use in a generic method for producing an alumin[i]um composite material in that a rolling ingot made of the cladding material is rolled down to the desired thickness on a hot roll. From the strip obtained in this way, plates for placement onto the core ingot are then cut off and placed onto the core ingot. Then this composite is subjected to cladding by rolling.

[0006] In this conventional method for producing an alumin[i]um material there is a problem in that the production of cladding sheets on the hot roll is very time consuming. Such time extensive use of the hot roll for the production of cladding sheets is problematic from the point of view of optimi[s]zed work processes in the rolling mill. At the same time, due to the principle of process, the parallel arrangement of cladding sheets made by rolling is poor. This results in uneven cladding which means that thicker plating sheets must be used than would be adequate with optimal plane-parallel arrangement, so as to ensure the necessary safety reserves. Furthermore, again due to inherent factors, only cladding sheets of the same thickness can be

produced during the rolling process. This not only leads to increased storage expenditure for cladding sheets which are not yet used, but it also leads to increased production costs because the production of cladding sheets of different thickness means that several ingots made from the cladding material have to be subjected to a rolling process. [At last]Lastly, the surfaces of the cladding sheets produced by rolling must be subjected to an expensive mechanical and chemical pre-treatment prior to rolling, so as to ensure impeccable connectability between the core ingot and the cladding sheets as a result of cladding by rolling.

SUMMARY OF THE INVENTION

[0007] It is the object of the present invention to provide a method for producing an alumin[i]um composite material or a method for producing cladding sheets from an ingot which significantly simplifies the known processes and, in addition, makes it possible to use cladding sheets with improved properties.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 shows a core ingot and two cladding sheets for use in a method for producing an aluminum composite material; and

[0009] FIG. 2 shows an embodiment of an ingot from which a cladding sheet is being cut.

DETAILED DESCRIPTION OF THE INVENTION

[0010] According to a first teaching of the invention relating to a method for producing an alumin[i]um composite material, the object explained and shown above is met in that the cladding sheets are cut off an ingot.

By no longer obtaining the cladding sheets by rolling them from an ingot made of cladding material, as has been the case up to now with the state of the art, but instead, by directly cutting said cladding sheets from the ingot, there are a number of advantages when producing alumin[i]um composite materials. First of all, it is now also possible to produce cladding sheets of different thickness from one ingot[;]. [t]This will considerably simplify production and storage. Furthermore, with the process according to the invention, the precise number of cladding sheets required can be produced from the initial ingot without any special expenditure. The time-consuming [expensive] hot rolling of the ingot from the cladding material is dropped out. In addition, any re-stretching of the rolled plate, which has regularly been necessary in the case of cladding sheets made by rolling, [is]does not apply in the case of cladding sheets which are directly cut off an ingot.

[0011] By cutting the cladding sheets from the ingot by sawing, according to an embodiment of the first teaching of the invention, an excellent plane-parallel arrangement of the cladding sheets can be achieved. Such exact plane-parallel configuration brings about an optimi[s]zation potential concerning the necessary thickness of the cladding sheets. Furthermore, the process of welding between cladding sheets and core ingots is considerably simplified. Finally, this results also in reduced requirements concerning surface treatment of the cladding sheets cut off the ingot by sawing. In particular, band saws are suitable for cutting cladding sheets from the ingot by sawing. [In respect of] With respect to ensuring plane-parallel configuration and minimum material removal, band saws are very well suited

for use in the method according to the first teaching of the invention.

[0012] According to a further embodiment of the first teaching of the invention, the cladding sheets are cut off the ingot at a thickness of 2 to 100 mm. As has already been mentioned, these thicknesses can be adjusted without further ado from one cladding sheet to the other, thus providing the option of producing cladding sheets made from a single ingot for a wide range of cladding thicknesses.

[0013] Surface treatment of the core ingot and/or of the cladding sheets prior to rolling results in an optimal connection between the core material and the cladding material during the rolling process. As has already been mentioned, when compared to the requirements of cladding sheets produced by rolling, there are now significantly reduced requirements concerning surface treatment of the cladding sheets which have, for example, been obtained by being cut off the ingot by sawing. This applies particularly with regard to chemical surface treatment.

[0014] According to a second teaching of the invention, the above-mentioned object for a method for producing cladding sheets from an ingot is met in that the cladding sheets are cut off an ingot. Of course, the advantages according to the invention also apply to the method, irrespective of the actual production method for an alumin[i]um material, according to the second teaching of the invention, for producing cladding sheets from an ingot consisting of cladding material. The advantages of arranging a method for producing an alumin[i]um material according to the first teaching of the invention can thus be transferred without further ado to a method for

producing cladding sheets from an ingot according to the second teaching of the invention.

[0015] There are a multitude of options for arranging and improving the teachings according to the invention. To this effect we refer, for example, [on the one hand to the claims which are subordinate to claim 1, otherwise also] to the description [of a] below and to the preferred embodiments that are described in conjunction with the drawings. A first example of the invention includes a method for producing an aluminum composite material in which a cladding sheet is placed at least onto one side of a core ingot, and in which the core ingot with cladding sheets in place is subjected to several roll passes characterized in that the cladding sheets are cut off an ingot. The method may include one or more of the following features: that the cladding sheets are cut off the ingot by sawing; that the cladding sheets are cut off the ingot at a thickness of 2 to 100 mm; that the core ingot and/or the cladding sheets are surface treated prior to rolling. A second example of the invention is a method for producing cladding sheets from an ingot, in particular for use in a method for producing an aluminum composite material in which a cladding sheet is placed at least onto one side of a core ingot, and in which the core ingot with cladding sheets in place is subjected to several roll passes, characterized in that the cladding sheets are cut off an ingot. The method for producing cladding sheets may be characterized by one or more of the features described in connection with the first example. [The following are shown in the drawing:

[0016] Fig. 1: an embodiment of a core ingot comprising two cladding sheets, for use in a method for producing an aluminium composite material; and

[0017] Fig. 2: an embodiment of an ingot from which a cladding sheet is being cut off.]

[0018] In the embodiment shown in [Fig]FIG. 1, a composite material includes core ingot 1 [comprises]and a cladding sheet (2, 3) both at the top and at the bottom. The materials of the cladding sheets (2, 3) are, for example, corrosion-resistant alumin[i]um materials, while the material of the core ingot 1 features high[-]_strength.

[0019] [Fig]FIG. 2 shows the production of a cladding sheet 4 made from an ingot 5 [comprising]including the cladding material, by means of a band saw 6. For example, a band saw is arranged in front of a roll stand, said band saw cutting the rolling ingot in longitudinal direction into several cladding sheets, with the cut off cladding sheets being transported on a roller table connected directly to the core ingot. [Fig]FIG. 2 shows that the method according to the invention makes it possible without further ado to cut cladding sheets 4 of different thickness and of exact plane-parallel configurations into the required number of plates.

MARKED UP VERSION OF REPLACEMENT ABSTRACT
PURSUANT TO 37 C.F.R.§ 1.121(b)(2)(iii)

VAW-6

ABSTRACT

[0020] The invention relates to a method for producing an alumin[i]um composite material in which a cladding sheet is placed at least onto one side of a core ingot, and in which the core ingot with cladding sheets in place is subjected to several roll passes, as well as a method for producing cladding sheets from an ingot. According to the invention, known methods are simplified and improved in that the cladding sheets are cut off an ingot. [Fig. 2 has been provided for the abstract.]
